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IS 1283 (1995, Reaffirmed 2005):
Bicycles--Free-Wheels--Specification (Second Revision). UDC 629.118.3 : 585.82

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IS 1283 : 1995
(Reaffirmed 2005)

भारतीय मानक
साइकिल — फ्री-व्हील — विशिष्टि
(दूसरा पुनरीक्षण)

Indian Standard
BICYCLES — FREE-WHEELS — SPECIFICATION

(Second Revision)

First Reprint MAY 2009

UDC 629.118.3 — 585.82

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 1995

Price Group 4

Bicycles Sectional Committee, TED 16

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Bicycles Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was originally published in 1958 and was revised in 1968. The second revision was undertaken to incorporate the latest technological advancements/developments that have taken place in the manufacture of bicycle components. Also the scope has been modified to exclude bicycle chains as separate specification on bicycle chains — characteristics and test method is under preparation by Tranmission Devices Sectional Committee. In this revision, all amendments relating to assembly, compression test, etc, have been included. In addition the grade of steel balls has also been specified.

In preparing this standard, assistance has been derived from the following:

JIS B 9410-1951 Free wheels, Japanese Standards Association.

Data Sheet No. 19 C (Sheet No. 1 and 2) Motor cycle and bicycle roller chain wheels, British Cycle and Motor Cycle Manufacturers and Trader Unions Ltd.

The committee composition responsible for the preparation of this standard is given in Annex A.

For the purpose of deciding, whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BICYCLES — FREE-WHEELS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard specifies the requirements for free-wheels used in bicycle.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
1570 (Part 4) : 1988	Schedules for wrought steels : Part 4 Alloy steels (alloy constructional and spring steel) with specified chemical composition and mechanical properties (*first revision*)
2403 : 1991	Short pitch transmission precision steel roller chains and chain wheels (*second revision*)
2500 (Part 1) : 1992	Sampling inspection procedures : Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (*second revision*)
2898 : 1976	Steel balls for roller bearings (*first revision*)
3798 : 1966	Glossary of terms used in the bicycles industry
4398 : 1994	Carbon chromium steel for the manufacture of ball, rollers and bearing races (*second revision*)
4454 (Part 1) : 1981	Steel wires for cold formed springs: Part 1 Patented and cold drawn steel wires—Unalloyed (*second revision*)
4905 : 1968	Methods for random sampling

3 NOMENCLATURE

3.1 For the purpose of this standard, the nomenclature given in IS 3798 : 1966 shall apply.

4 MATERIAL

4.1 Steel wire used in the manufacture of springs shall comply with the requirements of Grade 1 of IS 4454 (Part 1) : 1981.

4.2 The washers shall be manufactured from any material as agreed between the purchasers and the manufacturers.

4.3 Steel balls used shall conform to any one of the following grades:

> Grade 105 Cr 5 of Schedule IV of IS 1570 (Part 4) : 1988 or Grade 103 Cr 6 of IS 4398 : 1994. The finished balls shall conform to grade 200 of IS 2898 : 1976. The balls shall be heat treated to achieve hardness between 708 HV and 890 HV (with 5 kgf load). They shall also be truly spherical and uniform in size.

4.4 The steel used in the manufacture of chain sprocket, main body, cone and pawls and the heat treatment given to them shall comply the requirements specified in **7.1**.

NOTE — Besides the minimum properties specified, the materials other than those given in standard used for the manufacture of free-wheel components shall have metallurgical properties which would make them suitable for fabrication of the particular components in accordance with good engineering practice.

5 DIMENSIONS

5.1 The free-wheels shall conform to dimensions given in Fig. 1. The shape of the teeth on the sprocket shall be such as to suit the bicycle chains conforms to Chain No. 081 of IS 2403 : 1991.

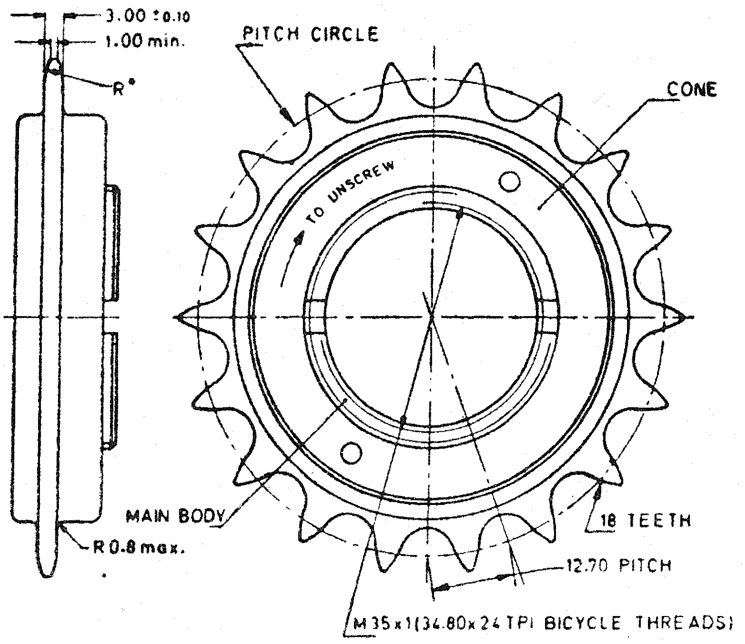
5.2 The ISO metric threads shall conform to the dimensions given in Fig. 2.

6 WORKMANSHIP AND FINISH

6.1 The free-wheels shall be so manufactured as to rotate true, and without friction and shake. The threads on the free-wheels shall be so formed as to facilitate easy fitting and replacement. The inside of ball races shall have smooth finish to ensure free running of balls.

6.2 All the components of free-wheel (except balls) shall be given a protective coating.

6.3 Prior to assembly the components shall be thoroughly washed and the ball races shall be charged with grease.

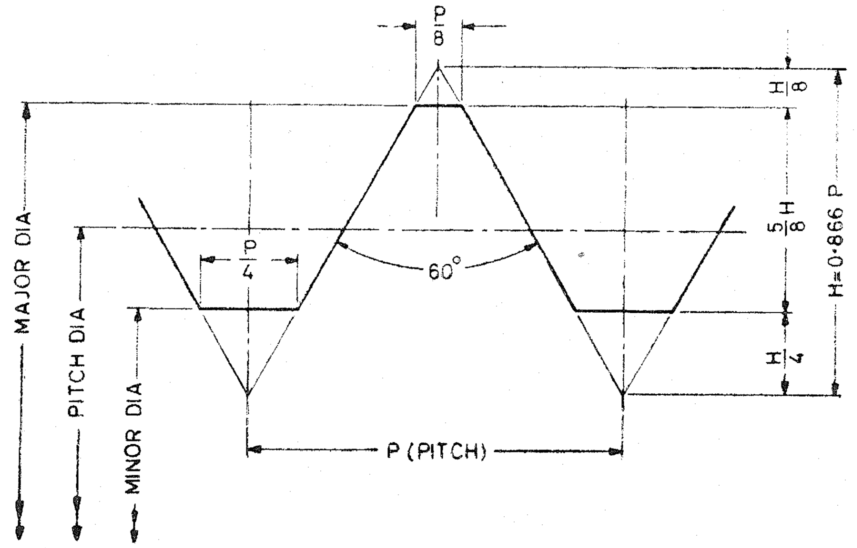


*To be radiused or chamfered.

NOTE — The illustration is diagrammatic only and is not intended to illustrate details of design.

All dimensions in millimetres.

FIG. 1 FREE-WHEEL ASSEMBLY (SCHEMATIC)



Nominal Size	**Pitch** *P*	**Internal Thread**					**External Thread**					
		Major Dia *Min*	Pitch Dia		Minor Dia		Major Dia		Pitch Dia		Minor Dia	
			Max	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*
M35 × 1	1	35·000	34·520	34·350	34·153	33·917	34·974	34·794	34·324	34·199	33·747	33·550

NOTE — If agreed to between the purchaser and the supplier free-wheels with 26 TPI may also be used.

All dimensions in millimetres.

FIG. 2 DIMENSIONS FOR ISO METRIC SCREW THREADS M35 × 1 — 6H/6 g

7 HARDNESS

7.1 After heat treatment the components shall have the following hardness value (with 5 kgf load) mentioned against each:

Component	*Hardness* (*HV*) *Min*
Chain sprocket (wearing surface)	600
Main body (wearing surface)	600
Cone (wearing surface)	600
Pawls	700

7.2 For the determination of hardness, any recognized form of hardness tester as agreed between the purchasers and the manufacturers may be used.

8 SAMPLING

8.1 Unless otherwise agreed to between the supplier and the customer, the procedure as given in IS 2500 (Part 1) : 1992 shall be followed for sampling inspection.

8.1.1 *Lot*

All the free wheels of the same dimension, material and manufactured under similar conditions of production shall be grouped together to constitute a lot.

8.1.1.1 For ascertaining the conformity of the lot to the requirements of the specification, all the free-wheels selected randomly from each lot shall be tested separately. In order to ensure randomness of selection, reference may be made to IS 4905 : 1968.

8.2 The inspection level, Acceptance Quality Level (AQL) and the type of sampling plan to be followed for various characteristics shall be as given in **8.2.1** and **8.2.2**.

8.2.1 For the characteristics, dimension, workmanship and finish, a single sampling plan with inspection level II and AQL of 1·5 percent as given in Tables I and IIA of IS 2500 (Part 1) : 1992 shall be followed.

8.2.2 For the characteristics, hardness and compression test, a single sampling plan with inspection level S-3 and AQL of one percent as given in Tables I and IIA of IS 2500 (Part 1) : 1992 shall be followed.

9 TESTS

9.1 The chain sprocket shall stand being compressed diametrically by 3 percent of its internal diameter without showing any cracks or break. The testing arrangement for carrying out the test shall be as shown either in Fig. 3, Fig. 4 or Fig. 5.

9.2 The free-wheel shall be suitably mounted and the chain sprockets shall be rotated. The free-wheel shall not have any axial or radial deflection exceeding 0·4 mm. The deflection shall be measured at the circular edge of the free-wheel.

10 MARKING

10.1 Free-wheels shall be marked with the source of manufacture and an arrow indicating the direction of unscrewing of the cone.

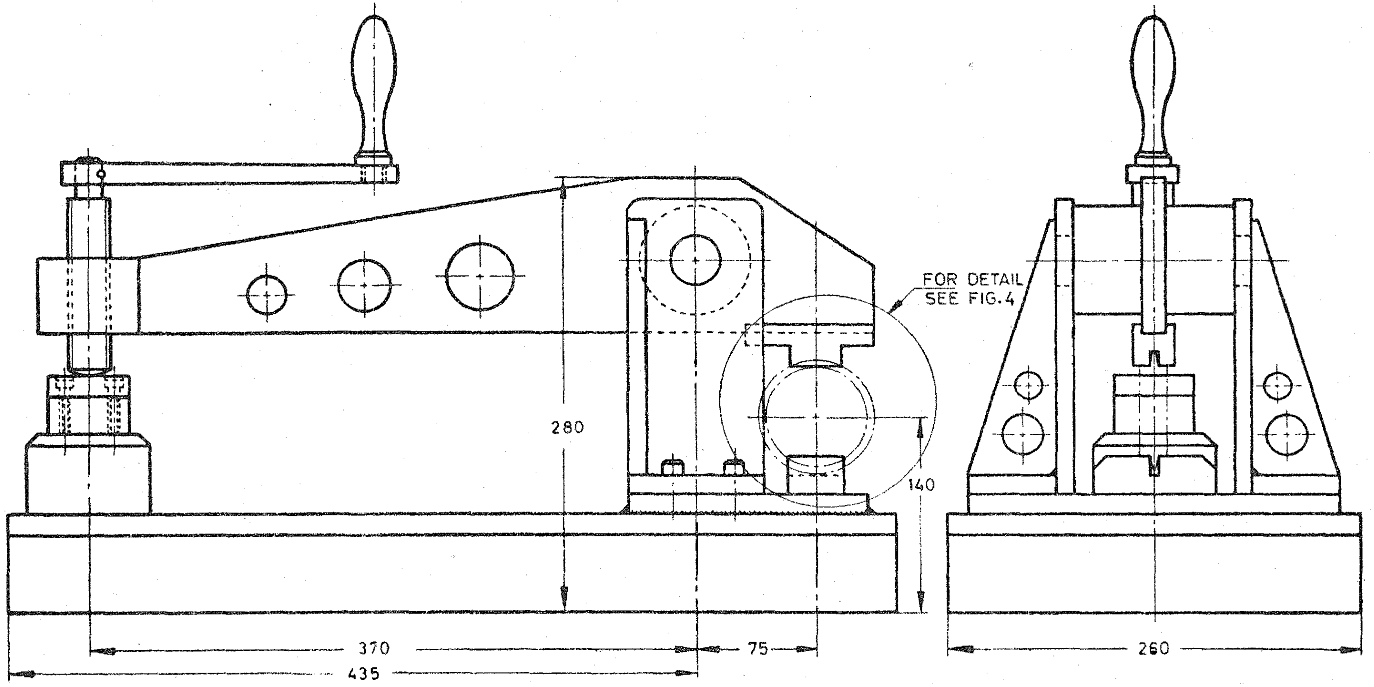
10.2 BIS Certification Marking

The product may also be marked with Standard Mark.

10.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

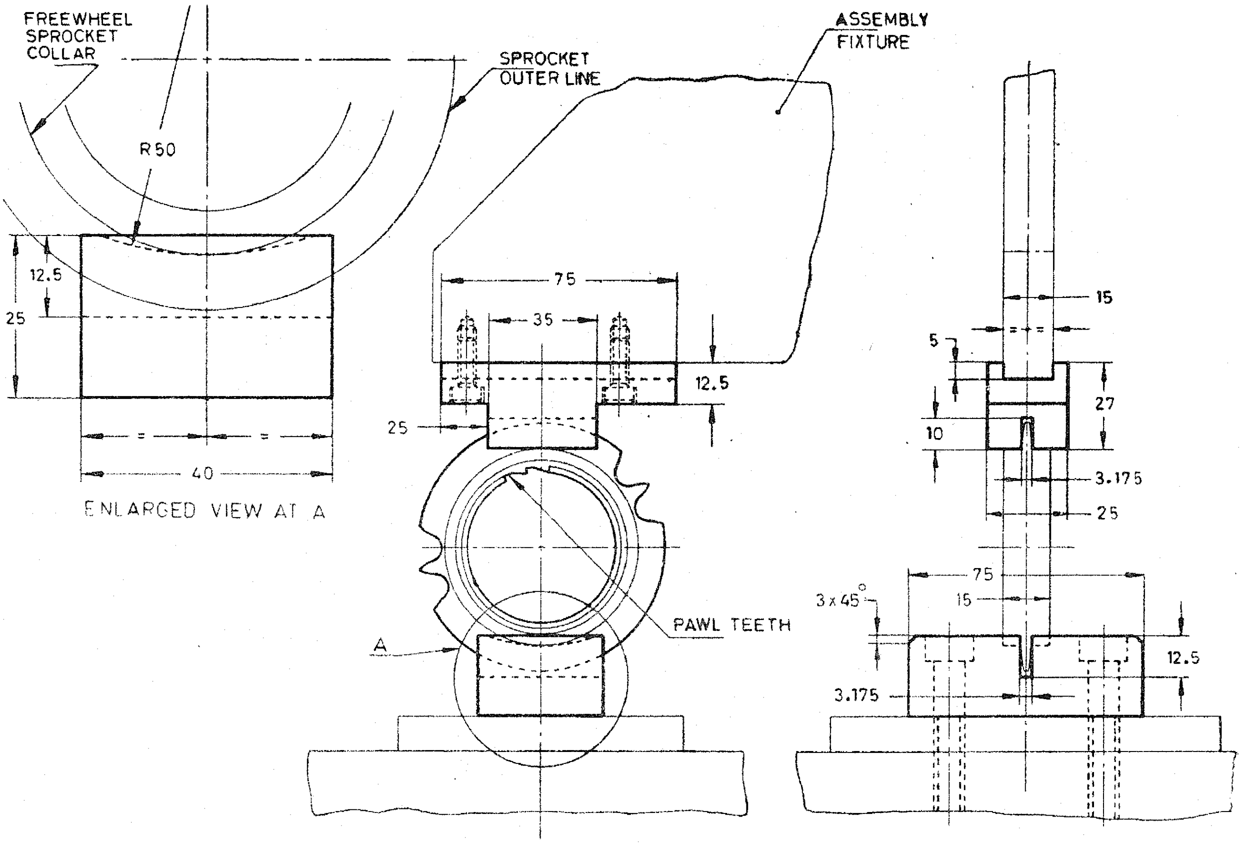
11 PACKING

11.1 Unless otherwise agreed upon, each free-wheel shall be wrapped in waterproof greased paper and packed in a cardboard carton bearing the source of manufacture and the country of origin.



All dimensions in millimetres.

FIG. 3 COMPRESSION TEST FOR FREE-WHEEL SPROCKET



All dimensions in millimetres.

FIG. 4 COMPRESSION TEST FOR FREE-WHEEL SPROCKET (DETAIL ARRANGEMENT FOR FIXING SPROCKET)

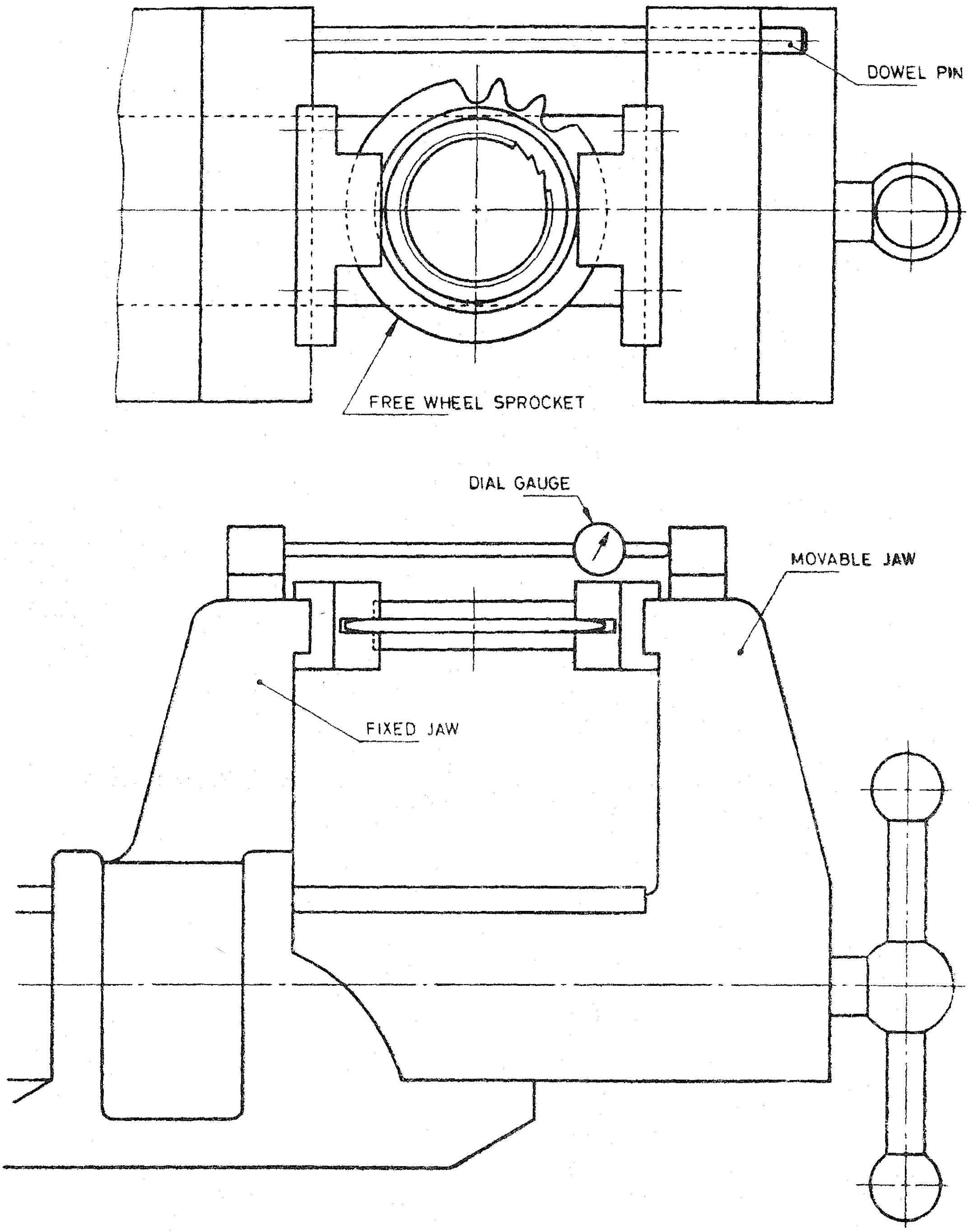


FIG. 5 ALTERNATIVE ARRANGEMENT FOR COMPRESSION TEST

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Bicylces Sectional Committee, TED 16

Chairman	*Representing*
Shri K. Padmanabhan	TI Cycles of India, Madras
Members	
Shri M. Srinivasan (*Alternate* to Shri K. Padmanabhan)	
Shri Ajit Singh	Kular Cycle Industries, Ludhiana
Shri Darshan Singh (*Alternate*)	
Shri H. S. Bains	Bicycle and Sewing Machine — R&D Centre, Ludhiana
Shri J. S. Randhawa (*Alternate*)	
Shri Manmohan Singh	United Cycle & Parts Manufacturers Association, Ludhiana
Shri Jaswant Singh (*Alternate*)	
Shri Harindr P. Bhogal	Bhogal Sons (Regd), Ludhiana
Shri Naginder Singh Bhogal (*Alternate*)	
Shri Brijmohan Lall	Hero Cycle Ltd, Ludhiana
Shri S. K. Rai (*Alternate*)	
Shri Navrattan Chopra	Super Cycle International, Ludhiana
Shri P. P. Dasgupta	Dunlop India Ltd, Calcutta
Shri K. Subramanian (*Alternate*)	
Shri Satish Kumar Dhanda	Sadem Industries, Ludhiana
General Manager	Director of Industries, Punjab, Chandigarh
Senior Technical Officer (*Alternate*)	
Shri Amrit Goyal	Roadmaster Industries of India Ltd, Rajpura
Shri T. R. Thatai (*Alternate*)	
Shri A. K. Gupta	Director of Industries, Haryana, Chandigarh
Shri R. N. Goyal (*Alternate*)	
Shri T. R. Kukreja	Ralson India Ltd, Ludhiana
Shri G. Sehgal (*Alternate*)	
Shri Girish Kapur	Atlas Cycle Industries Ltd, Sonepat
Shri Lok Nath Naseem (*Alternate*)	
Shri Harsh Kumar	Tata Iron and Steel Co Ltd, Jamshedpur
Shri C. B. Lunawat (*Alternate*)	
Shri Joginder Kumar	J. K. Cycles, Ludhiana
Shri I. C. Khanna	Directorate General of Supplies & Disposals, New Delhi
Shri R. K. Khanna	Allied Exports (I), Ludhiana
Shri A. R. Kulkarni	Ministry of Defence, DGQA (V), Ahmednagar
Shri A. N. Khardenavis (*Alternate*)	
Shri Inderjit Singh Pahwa	Avon Cycles Ltd, Ludhiana
Shri Harcharan Singh (*Alternate*)	
Shri Rajiv Raizada	Export Inspection Council of India, New Delhi
Shri T. S. Narula (*Alternate*)	
Shri Sardar Singh	Navyug Bicycle Industries, Ludhiana
Shri Abhijit Sen	Sen & Pandit Pvt Ltd, Calcutta
Shri S. K. Chakraborty (*Alternate*)	
Shri Jagdeep Singla	Eastman Industries, Ludhiana
Shri K. Subramanian	Hartex Rubber Ltd, Hyderabad
Shri S. Kanojia (*Alternate*)	
Shri Sushil Kumar	Department of Technical Development, Ministry of Industry, New Delhi
Shri S. S. Gupta (*Alternate*)	
Shri N. S. Judge, Director (Transport Engineering)	Director General, BIS (*Ex-officio Member*)

Member Secretary
Shri S. B. Roy
Joint Director (Transport Engineering), BIS